

Annex 6

DISCIPLINE DESCRIPTION

1. Information on the study programme

1.1 Academic institution	UNIVERSITY OF ORADEA
1.2 Faculty	FACULTY OF ENVIRONMENTAL PROTECTION
1.3 Department	ENVIRONMENTAL ENGINEERING
1.4 Field of study	ENVIRONMENTAL ENGINEERING
1.5 Cycle of study	BACHELOR
1.6 Study programme/Qualification	ENGINEERING OF BIOTECHNICAL AND ECOLOGICAL SYSTEMS / ENGINEER

2. Information on the discipline

2.1 Name of discipline	Hydrology and Hydrogeology II						
2.2 Course holder	Lecturer Nandor Köteles Eng., Ph.D						
2.3 Seminar/Laboratory/Project holder	Lecturer Nandor Köteles Eng., Ph.D						
2.4 Year of study	II	2.5 Semester	III	2.6 Type of evaluation	Ex	2.7 Regime of discipline	DD

(C) Compulsory; (O) Optional; (E) Elective

3. Total estimate time (hours per semester of didactic activities)

3.1 Number of hours per week	3	out of which: 3.2 course	2	out of which 3.3 seminar/laboratory/project	1
3.4 Total hours in the curriculum	42	out of which: 3.5 course	28	out of which 3.6 seminar/laboratory/project	14
Time allotment					hours
Study assisted by manual, course support, bibliography and notes					30
Additional documentation in the library/ on specialised electronic platforms and in the field					20
Preparation of seminars/laboratories/ topics/reports, portfolios and essays					10
Tutorship					20
Examinations					3
Other activities.....					1
3.7 Total hours of individual study	84				
3.9 Total hours per semester	140				
3.10 Number of credits	5				

4. Prerequisites (where appropriate)

4.1 curriculum	(Conditioning) Hydrology and hydrogeology I, Ecology, Meteorology.
4.2 competences	Familiarize future specialists in the supervision and management of environmental factors with concepts and methods of water research.

5. Conditions (where appropriate)

5.1. related to course	Videoprojector, Screen.
5.2. related to seminar/laboratory/ project	Apparatus for conducting laboratory hours; Knowledge of the notions contained in the laboratory work to be carried out.

6. Specific competences acquired	
Professional competences	<p>C1.2 Use of basic scientific knowledge in defining and explaining concepts specific to engineering and environmental protection</p> <p>C2.2 Explaining and interpreting basic concepts, methods and models in environmental engineering issues</p> <p>C3.4 Use of appropriate analysis methods to characterize environmental factors</p> <p>C4.3 Identification of interdependencies between pollutants and environmental effects</p> <p>C5.5 Elaboration of professional projects using the modeling and simulation methods of environmental processes</p> <p>C6.1 Identification and specification of information on the best available technology in the field</p>
Transversal competences	<p>CT2. Identificarea rolurilor si responsabilităților într-o echipa pluridisciplinara și aplicarea de tehnici de relaționare și munca eficientă în cadrul echipei</p>

7. Objectives of discipline (coming from the specific competences acquired)

7.1 General objective	<ul style="list-style-type: none"> • Knowledge of the water circuit in nature, the distribution of water on the globe, and the general classification of waters. • Knowledge of underground water dynamics, underground water hydrogeology. • Knowledge of aquifer morphology, hydrodynamics and hydro-geochemistry of groundwater.
7.2 Specific objectives	<ul style="list-style-type: none"> • Acquiring knowledge to enable: • be able to take samples of water by various methods ensuring that the harvested samples are representative of the characterized assembly; • Identify and understand the main leak components; superficial leakage, hypodermic leakage, underground leakage and leakage; • Knowledge of the hydrographical response to climate

	<p>impulses and the persistence of climatic deviations;</p> <ul style="list-style-type: none"> • Formation and evolution of the seasonal regimes: large waters, small summer-autumn waters, small winter waters; • Students' initiation in applied problems of measurements, calculations and hydrological representations.
--	---

8. Content*/

8.1 Course	Methods of teaching	No. of hours/Remarks
1. General notions of hydrogeology. The origin of groundwater	Interactive lecture with video projector	4
2. Hydrogeological properties of rocks	Interactive lecture with video projector	4
3. Water types in rocks	Interactive lecture with video projector	4
4. Ground water distribution	Interactive lecture with video projector	6
5. Aquifer layers. Groundwater aquifer layers, Feeding aquiferous aquatic layers, Types of aquiferous aquatic layers, Deep aquifer layers, Piezometric level and its variations, Romania's underground water resources and their quality	Interactive lecture with video projector	6
6. Springs Classification of springs, Mineral waters	Interactive lecture with video projector	4
<p>Bibliography</p> <ol style="list-style-type: none"> 1. Călin Angela, Vlad Carmen, 2003, <i>Hidrobiologie și sisteme acvatice</i>, Editura Matrix Rom București. 2. Domuța C., Brejea R., 2010, <i>Monitoringul mediului</i>, Editura Universității din Oradea. 3. Găstescu, P., 1990, <i>Fluviile Terrei</i>, Editura Sport – Turism, București. 4. Găstescu, P., 1998, <i>Hidrologie</i>, Editura Roza vânturilor, Târgoviște. 5. Kőteles Nandor, 2010, <i>Hidrologie și hidrogeologie aplicată</i>, Editura Universității din Oradea. 6. Kőteles Nandor, 2014, <i>Hidrologie</i>, Editura Universității din Oradea. 7. Pișota I., 1995, <i>Hidrologie</i>, Editura Universității București. 8. Sorocovschi V., 2002, <i>Hidrologia uscatului I-II</i>, Editura Casa cărții de știință, Cluj-Napoca. 9. Șerban, P., 1989, <i>Hidrologie dinamică</i>, Editura Tehnică, București. 10. Újvári J., 1972, <i>Geografia apelor României</i>, Editura Științifică, București. 11. Zamfirescu F., 1995, <i>Elemente de bază în dinamica apelor subterane</i>, Editura Universității București. 12. Zăvoianu, I., 1999, <i>Hidrologie</i>, Editura România de Măine, București. 		
8.3 Laboratory		
1. Measurements of the piezometric level oscillations and their processing	Demonstration, Practical Application	2
2. Drawing up of groundwater maps with hydroisoes and hydroisobates	Demonstration, Practical Application	4
3. Determination of groundwater drainage direction survey vertices	Demonstration, Practical Application	2

4. Experimental determination of rock porosity	Demonstration, Practical Application	2
5. Determination of permeability of different types of rocks	Demonstration, Practical Application	2
6. Assessment of knowledge gained during laboratory classes	Demonstration, Practical Application	2
Bibliography 1. Dalea A., Beleş Daniela, Cociuba Cornelia, 2010, <i>Hidrologie - lucrări practice</i> -, Editura Universităţii din Oradea., 2. Jude E., 2010, <i>Ecologie-ghid practic</i> , Editura Universităţii din Oradea. 3. Köteles N., 2010, <i>Hidrologie și hidrogeologie aplicată</i> , Editura Universităţii din Oradea. 4. Pişota I., 1995, <i>Hidrologie</i> , Editura Universităţii Bucureşti. 5. Mănescu S., Cucu M., Diaconescu M.L., 1994, <i>Chimia sanitară a mediului</i> , Editura Medicală.		

* The content, respectively the number of hours allocated to each course / seminar / laboratory / project will be detailed during the 14 weeks of each semester of the academic year.

9. Corroboration of discipline content with the expectations of the epistemic community, professional associations and representative employers from the field corresponding to the study programme

▪ The content of the subject is adapted and satisfies the requirements imposed by the labor market, being agreed by social partners, professional associations and employers in the field of the bachelor's program. The content of the discipline can be found in the curriculum of the Environmental Engineering specialization and other academic centers in Romania that have accredited these specializations, thus knowing the basic notions is a stringent requirement of the employers in the field of the environment.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the final grade
10.4 Course	Assessment of knowledge of course content - minimum grade 5	Oral exam	80%
10.5 Seminar	-	-	-
10.6 Laboratory	Drawing up and presenting a report - minimum grade 5	Teaching laboratories and supporting them	20%
10.7 Project	-	-	-
10.8 Minimum standard of performance			
Undertaking coordinated work to solve specific problems in the field, with the correct assessment of the workload, available resources, the time required to complete and the risks under the conditions of health and safety at work.			

Date of completion

Signature of course holder**

Signature of seminar
laboratory/project holder **

October 2018

Lecturer Nandor Köteles Eng., Ph.D
kotelesnandor@yahoo.com

Lecturer Nandor Köteles Eng., Ph.D
kotelesnandor@yahoo.com

Date of approval in the department

.....

Signature of the Head of Department

.....

Dean signature

.....

** - Name, first name, academic degree and contact details (e-mail, web page, etc.) will be specified.

.....

Signature of the Head of Department***

.....

Dean Signature***

.....

*** - Name, first name, academic degree and contact details (e-mail, web page, etc.) of the academic entity beneficiary of the Discipline Outline will be specified.

.....